



Finding Outside Partners to Help with NASA Missions

Although most people might think of *Spinoff* magazine when they think of technology transfer at NASA, Goddard's Office of Technology Transfer is working to create success stories related to other types of technology transfer. Why? Because the same types of organizations that can use technologies developed at Goddard—medical, transportation, electronics, manufacturing, defense/homeland security, and many more—also can serve as valuable resources for Goddard.

"Often their technologies can be adapted to address space mission needs, allowing NASA to reach its goals faster and more efficiently," said OTT chief **Nona Checks** in October at the International Astronautical Congress in Fukuoka, Japan. "Therefore, NASA also tries to form partnerships with companies, universities, and other federal labs to develop new technology that supports its missions."

In keeping with this philosophy, Goddard's OTT has been gathering information about the research areas at Goddard that might

benefit from partnering with another federal lab, a university, or a private company. OTT has been working with Goddard's chief technologist **Peter Hughes** as well as **Bob Beaman** (Code 563), **Charles Engler** (Code 544), **Jaime Esper** (Code 592), **Yury Flom** (Code 541), **William Heaps** (Code 554), **Ken Hinkle** (Code 540), **Michael Johnson** (Code 560), **Drew Jones** (Code 543), **David Leisawitz** (Code 665), **Julie Loftis** (Code 580), **Vladimir Lumelsky** (Code 586), **Barbie Medina** (Code 588), **Rud Moe** (Code 442), **Dan Powell** (Code 542), **Joe Schepis** (Code 544), **Peter Shu** (Code 553), **Ted Swanson** (Code 540), and **Steve Talabac** (Code 586). The OTT is grateful to these individuals for their cooperation in these efforts and looks forward to speaking with more innovators in the coming months.

In addition, OTT has held preliminary meetings with several key organizations that might be interested in partnering with Goddard for joint research in technology areas of interest to both

(continued on page 3)

Agreement with UMBC "Activates" Goddard Technologies

Technologies developed at Goddard for the space program have a new doorway into the commercial marketplace: the ACTiVATE program at the University of Maryland-Baltimore County (UMBC). ACTiVATE stands for Achieving the Commercialization of Technology in Ventures through Applied Training for Entrepreneurs.

Goddard's OTT has established a formal agreement with UMBC to participate in ACTiVATE. And Goddard has contributed more technologies than any other Maryland research institution during the program's first year.

"Access to high-quality technology is critical to the success of the ACTiVATE program," said Stephen Auvil of UMBC's Office of Technology Development. "Through this key partnership with NASA Goddard Space Flight Center, the ACTiVATE program will rely on NASA's valuable research and long tradition of innovation to provide such technologies."

The 2005 Program

Four Goddard technologies were submitted to ACTiVATE's Phase I, where teams analyze the business opportunity. Technologies that move on to Phase II are reviewed by larger, entrepreneur-led business teams that establish a business plan. A select few technologies enter Phase III, where would-be entrepreneurs seek potential funding and licensing.



Goddard's Capillary-Pumped Loop Body Warmer technology is moving into Phase II of UMBC's ACTiVATE program.

One of Goddard's technologies—the Capillary-Pumped Loop Body Warmer developed by **Ted Swanson** (Code 540) and the late Paul Wren—has been selected for Phase II. "This program is an excellent opportunity for Goddard technologies," said OTT's **Monica Montague**, who negotiated the agreement with UMBC. "We're getting useful feedback on the technologies that received ACTiVATE assessments. And we'll be able to leverage those data for future technology transfer efforts."

Looking Ahead

OTT is currently selecting Goddard technologies to submit for evaluation in the 2006 ACTiVATE program and expects to complete this process by March 15, 2006. For more information about OTT's partnership with UMBC, please contact Monica Montague (6-7957; Monica.R.Montague@nasa.gov). ■

Goddard Atmospheric-Monitoring Technologies Win Mid-Atlantic FLC Award

At a September 15th awards ceremony in Rocky Gap, Maryland, Goddard's Micro Pulse Lidar (MPL) and MPL Network (MPLNET) were awarded the 2005 Federal Laboratory Consortium for Technology Transfer (FLC) Mid-Atlantic Regional Excellence in Technology Transfer Award. The MPL device was developed by **James Spinhirne** (Code 613.1), and the MPLNET was spearheaded by **Ellsworth (Judd) Welton** (Code 613.1).

Revolutionizing atmospheric aerosol and cloud data gathering, the MPL device provides ground-based, continuous monitoring of vertical distributions of dust, soot, sulfate, sea salt, and other aerosol particles, helping researchers better understand pollution patterns and climate change. "The MPL device was the first lidar-based design to be eye-safe, small, simple, and reliable," said Dr. Spinhirne.

Established in 2000 and funded by NASA, MPLNET collects data from many MPL devices across the globe and publishes the data online, making it available for free to all researchers. "We wanted to provide a means of disseminating MPL expertise to those purchasing commercial MPL systems. We also sought to organize

MPL operations into a network so that the data could be merged with larger climate and weather observation programs around the world. Thus, MPLNET was born." said Dr. Welton.

Under the agreement brokered by Goddard's Office of Technology Transfer, NASA has received over \$13,000 in royalty payments for the 49 MPL units have been sold worldwide. The MPLNET Web site has received more than 18,000 hits to date and has more than 178 registered users.

For more information about OTT's Awards Program, contact **Dale Hithon** (6-2691; Dale.L.Hithon@nasa.gov). ■



Diane (Betsy) Pugel

Code 553 • 3 years at NASA

Education: PhD candidate, experimental condensed matter physics, Univ. of Maryland-College Park; MS, physics, Univ. of Illinois; BS, Physics, Univ. of Michigan-Ann Arbor

Born: Detroit, Michigan

Tell us about your work with OTT. What have you been doing?

I became involved with OTT in 2004, when I wrote my first invention disclosure. I wrote another disclosure that year, and it caught the eye of OTT, which subsequently took prototypes to conferences. I have been using ferrofluidic solutions of variable viscosities to develop micron and sub-micron pointed structures that can be coated with metals or wide-band gap semiconductors. This may prove to be a cheap, rapidly assembled, and well-oriented alternative to nanotube-based field emitters. As a member of the Detector Systems Branch, I am surrounded by talented people who are innovative in their approach to detector design and fabrication, and their interest and support has been equally pivotal in the development of this technology.



How have you benefited from this work?

I have obtained a provisional patent for the ferrofluid structures. OTT also generated opportunities to give my invention visibility. I am particularly grateful to OTT for providing funding for the purchase of materials to continue this work, since this invention could leverage future R&D opportunities and applications for NASA.

Any advice for your colleagues?

I have two pieces of advice. (1) Innovations happen if you let them. While you have to focus on your day-to-day project-centered work, it is important to stretch your mind now and again and pursue things that are not directly along the focus of your project. While thinking about a problem that the UV Astrophysics Group had mentioned regarding photocathodes, I found myself remembering my days of play-

Three Space Act Board Awards Issued

NASA's Invention and Contributions Board recognized the following innovations with a Space Act Board Award:

- Low-Cost and High-Quality Carbon Nanotubes by **Jeannette Benavides** (Code 562) and **Henning Leidecker** (Code 562)
- AutoChem by **David Lary** (Code 610)
- LIS V.4 by **James Geiger** (Code 587), **Paul Houser** (retired), **Sujay Kumar** (University of Maryland-Baltimore County [UMBC]), **Luther Lighty** (Code 587), **Susan Olden** (Code 586), **Christa Peters-Lidard** (Code 614), and **Yudong Tian** (UMBC)

These awards, which can reach a maximum of \$100,000, are bestowed for technologies with significant scientific and technical contributions. Innovations must have a New Technology Report on file (see <http://entre.nasa.gov>). OTT can help innovators prepare the award application (Form 1329). For more information, see OTT's Web site (<http://techtransfer.gsfc.nasa.gov>) or contact **Dale Hithon** (6-2691; Dale.L.Hithon@nasa.gov). ■

(continued on page 3)

Workshop to Find Partners for Joint Research a Success

workshop

On August 18th, companies, universities, and government labs within the central New York region met with some of Goddard's senior technologists to explore areas of mutual R&D interest and opportunities for joint research. More than 50 senior executives from 41 organizations attended NASA Goddard's Joint Venture Workshop on Technology Trends.

Held in Utica, the workshop was sponsored by Goddard's Office of Technology Transfer and organized by NASA's Northeast Regional Technology Transfer Center (RTTC), the Center for Technology Commercialization (CTC).

The workshop gave attendees the opportunity to make connections and develop relationships with Goddard's technology decision makers. "The companies and other organizations that attended this workshop have technical strengths that overlap with several of our core interests," said **Nona Cheeks**, chief of Goddard's OTT.



Goddard's Peter Hughes (left) and CTC's Don McAlister (center) explore partnership possibilities with a company attending the Joint Venture Workshop in Utica.

"We found connections in sensors, hardware and software developments, electronic components, and advanced manufacturing automation systems."

The formal presentations began with a summary of technology transfer at Goddard by Ms. Cheeks. Then **Peter Hughes**, Goddard's acting chief technologist, gave an overview of Goddard's technical needs over the next 10 years. More detailed presentations were given by **Julie Loftis**

(Code 580), **Jill Holz** (Code 442), and **Sachidananda Babu** (Code 553). These were followed by one-on-one meetings where partnership possibilities could be discussed.

The Utica workshop was the third such event for Goddard. "We have found that this format is an excellent method for creating lasting relationships with potential partners," said Ms. Cheeks. OTT therefore is planning another Joint Venture Workshop in Boston in November. ■

researcher profile

(continued from page 2)

ing with ferrofluids. I literally sketched out the idea that is now a provisional patent on Post-it® notes while driving (at red lights only, of course). You should have seen my steering wheel! (2) Having served on the New Employee Welcoming Board, I particularly want to tell new folks that OTT is here for you! If you are unsure about the innovative viability of your ideas or you have questions, OTT has great staff to enlighten and inform you about the disclosure and patent process. Just because you're new, doesn't mean you cannot innovate or receive support for your innovations. ■

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Event	Technologies/Topics	Outcome
Joint Venture Workshop (Utica)	Goddard R&D	Provided a forum for identifying partnering opportunities with NASA
NASA Small Business Solutions Conference	Various	Networked with small businesses interested in working with NASA
Annual meeting of Mid-Atlantic Region of the Federal Laboratory Consortium for Technology Transfer	Technology transfer	Learned of tech transfer best practices
NASA Goddard 4th Technology Transfer Investment Workshop	Disruptive technologies and the build-vs.-buy decision	Training for Goddard innovators and networking with industry

recent events

Outside partners (continued from page 1)

parties. These organizations include Carnegie Mellon University's Robotics Institute; Caterpillar; Cougaar Software; the National Center for Defense Robotics; Scientific Systems Company, Inc.; Stratom; and Valley Technologies, Inc.

Goddard researchers are encouraged to be on the lookout for opportunities for joint-research partnerships or other collaborations. Ideas might be sparked by the NASA Partnership Portal (<http://partnership.gsfc.nasa.gov>), which lists NASA needs, technology offerings, and opportunities for future collaborations.

For more information or to suggest partnership opportunities, contact the OTT at **partnership@gsfc.nasa.gov**. ■

New technologies were reported by the following civil servants, contractors, and universities.

Civil Servants

Code 100

Phillip Merritt: Software Metrics Analysis Tool (SMAT)

Aaron Wilson: Metric Analysis Tool (MAT)

Code 400

Beth Weinstein: Data Validation User Interface (DVUI); A Navigation/Discovery Client Via Earth Observing System ClearingHouse (ECHO)

Code 500

Hossin Abdeldayem: Multipurpose Fiber Injected Micro-spherical Lidar System

Eric Cardiff: An Oxygen Production Plant in the Lunar Environment: A Vacuum Pyrolysis Approach

James Carpenter: Navigation Accuracy Guidelines for Orbital Formation Flying

Bruce Dean and Jason Budinoff: Image-Based Wavefront Sensing for Space Optics Control

Rodger Farley: (1) Planetary Balloon Software Theory Manual and (2) Balloon Ascent: 3D Simulation Tool for the Ascent and Float of High-Altitude Balloons

Stephanie Getty: Design of a Lightweight, Low-Power Magnetometer Based on a Single-Walled Carbon Nanotube Mat

Jeffrey Jaso: Spaceflight Ka-Band Transmitter

Landis Markley: Orthogonal Attitude Filter

Harry Shaw: MEMS Structure for Electrophoretic and Dielectrophoretic Separation of Particles by Contactless Electrodes

Peter Shirron, Don Wegel, and

Michael DiPirro: A Continuous Adiabatic Demagnetization Refrigerator for Cooling to 10 MK and Below

James Smith: Miniaturized Double-Latching Solenoid Valve

Scott Starin and Paul Mason: Propellant Sloss Analysis for the Solar Dynamics Observatory

Scott Starin, et al.: Attitude Control System Design for the Solar Dynamics Observatory

James Tuttle, et al.: A Lightweight, Low-Current 10-Kelvin Magnet for Space-Flight ASRs

Kongpop U-Yen: Compact, Wide Spurious-Free Bandwidth Bandpass Filter Using Stepped Impedance Resonators

John Vranish: Driven Ground

Michael Wilks: High-Impulse Nanoparticle-Based Gel Propellants

Code 600

Robert Baker: High-Voltage Clock Driver for Photon Counting CCD Characterization

Edward Sittler: (1) Electric Field Antenna for Solar Probe and Space Missions Exposed to High Photon Intensities within the Inner Heliosphere and (2) Fast 3D Ion Mass Spectrometer for Solar Wind and Magnetospheric Plasmas

Norden Huang: Ensemble Empirical Mode Decomposition: A Noise-Assisted Data Analysis Method

Virginia Kalb: (1) Implementation of the Proper Orthogonal Decomposition of a Multivariate Time Series; (2) Projection to a Dynamical System for the Incompressible Navier-Stoke Equations; (3) Flow Solver for Incompressible 2-D Drive Cavity; and (4) Flow Solver for Incompressible 2-D Rectangular Domains

Richard Lyon: Optical Mixer for Interferometric Beam Combiner

Contractors

AdTech Photonics, Inc.

ADVR, Inc.

American Semiconductor

Anasphere, Inc.

Biospherical Instruments, Inc.

Busek Co. Inc.

CompSys Technologies Inc.

Eltron Research, Inc.

Emergent Space Technologies

Honeywell Technical Solutions, Inc.

Hyper Tech Research

Invertix Corporation

L3 Communications, GSI

LJT and Associates

LW Microsystems, Inc.

OSC

Power Electronics Leveling Solutions L.L.C.

QSS

Remote Sensing Solutions, Inc.

Rockwell Scientific Company, LLC

SAIC

Science Systems and Applications, Inc.

SiWave, Inc.

Star Cryoelectronics

Swales Aerospace

Tech-X Corporation

Universities

George Washington University

Massachusetts Institute of Technology

Northeastern University

Rice Space Institute

University of Missouri-Rolla

University of Arkansas

University of Maryland

University of South Florida

University of Buffalo

Software Releases: 13

Innovators receive a \$500 to \$1,000 award for software approved for release.

- Simple, Scalable, Script-based Science Processing Archive, **Christopher Lynnes** (Code 610), **Mahabaleshwar Hedge** (600), and **C. Wrandle Barth** (Code 610)
- Using IV and V Findings to Perform FSW Technical Assessments, **Shirley Savirino** (180), **Scott Johnson** (Code 180), **Mike Beims** (Code 180), **Aileen Bisier** (180), **Ken McGill** (Code 180), and **Steve Pukansky** (Code 180)
- A Method and System for Procedure Development and Verification by Formal Specifications Derived Mechanically from Informal Procedure Descriptions, **Mike Hinchey** (Code 581), **James Rash** (Code 588), **Christopher Rouff** (Code 500), and **Dennis Gracanin** (Virginia Polytechnic University)
- Formation Flying Testbed Software Architecture and Implementation, **Everett Cary** (Code 591), **David Gaylor** (Code 595), **Jason Mitchell** (Code 591), **John Higinbotham** (Code 588)
- Parallel Computing Tools for IDL, **Peter Messmer** (631) and **Seth Veitzer** (631)
- Fault Tolerant Digital Signal Processing (DSP), **Graham Stead** (614)
- Automated Segmentation of Insulin Granules from Scanning Electron Micrographs (SEM) of Rat Pancreatic Beta Cells, **Murray Loew** (691), **Timothy McClanahan** (Code 691), and **Geoffrey Sharp** (691)
- Core Command and Data Handling Component, **Donald West** (Code 681), et al.
- Integrated Test and Operations System (Release 7-3), **Karen Calvert** (Code 584), **Warren Thompson** (Code 444), **Greg Greer** (Code 584), **Brian Goldman** (Code 584), **Mark Richardson** (Code 584), and **Robert Rapp** (Code 584)
- Navigation Accuracy Guidelines for Orbital Formation Flying, **Kenneth Carpenter** (Code 667)
- Data Validation User Interface (DVUI): A Navigation/Discovery Client Via Earth Observing System ClearingHouse (ECHO), **Beth Weinstein** (Code 586)
- Software Metrics Analysis Tool (SMAT), **Phillip Merritt** (Code 180)
- Metric Analysis Tool (MAT), **Aaron Wilson** (Code 180)

Issued Patents: 1

- U.S. Patent 6,936,122: Adhesive Bubble Removal Method and Apparatus for Fiber Optic Applications, **John Kolasinski** (Code 565)

Patent Applications Filed: 13

Innovators receive a \$500 to \$1,000 award for a filed patent.

Provisional Patents Filed: 7 ■